



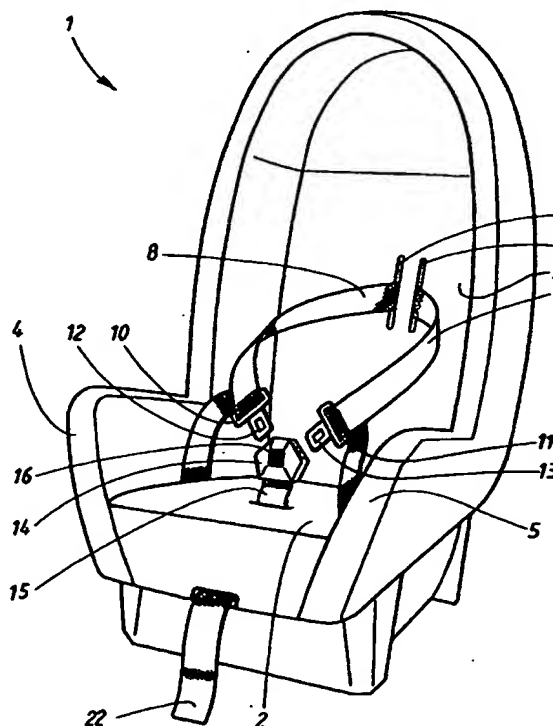
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<p>(21) International Application Number: PCT/SE99/00020 (22) International Filing Date: 12 January 1999 (12.01.99) (30) Priority Data: 9800192-8 23 January 1998 (23.01.98) SE (71) Applicant (for all designated States except US): AB VOLVO [SE/SE]; S-405 08 Göteborg (SE). (72) Inventor; and (75) Inventor/Applicant (for US only): BERGENHEIM, Eddy [SE/SE]; Morkullgatan 14 A, S-426 69 Västra Frölunda (SE). (74) Agents: GRAUDUMS, Valdis et al.; Albihs Patentbyrå Göteborg AB, P.O. Box 142, S-401 22 Göteborg (SE).</p>		<p>(81) Designated States: BR, CN, JP, KR, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments. In English translation (filed in Swedish).</i></p>

(54) Title: CHILD SEAT FOR VEHICLES

(57) Abstract

The invention relates to a child seat (1) for vehicles, comprising a seat (2), a backrest (3) and a vertically adjustable seat belt consisting of at least one belt band (8; 9), equipped with a locking device (10; 11) arranged for lockable co-operation with a belt lock (14) that is fixedly anchored in said child seat (1). The invention is characterised by said backrest (3) being designed with at least one vertically extending slot (6; 7), and by the belt band (8; 9) being arranged to run through said slot (6; 7) and up to said belt lock (14). Through the invention, an improved child seat for vehicles is provided, by the aid of which an automatic adjustment of a safety belt in relation to the body size of the passenger is obtained.



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CHILD SEAT FOR VEHICLES

TECHNICAL FIELD

The present invention relates to a child seat for vehicles according to the preamble
5 of the accompanying claim 1. The invention is particularly intended for use in connection with that type of child seats, which is provided with safety belts.

BACKGROUND ART

In connection with vehicles, e.g. passenger cars, safety belts are used in a known
10 manner to protect those travelling in the vehicle. In case of a collision or of hard braking, the passenger can be retained in his seat by means of the safety belt, which provides enhanced safety.

Normal vehicle seats and safety belts are not adapted and dimensioned for achieving
15 optimum protective action in case the passenger is a small child. For this reason it is previously known to use special child seats, more particularly in the form of separate child seats that can be detachably fitted in one of the existing vehicle seats. It is particularly common with child seats adapted to be fitted the wrong way
20 round in the front passenger seat of the vehicle, i.e. so that the passenger in the child seat will be travelling with his back turned towards the front of the vehicle. Hereby, a high safety is achieved for the passenger in the child seat in case of a collision or of hard braking.

With the intention of providing a particularly high safety in connection with detach-
25 able child seats it is previously known to provide such a seat with a safety belt. In this way, the child travelling in the child seat can be fastened and prevented from being thrown out of the child seat for example in a collision. Regarding the function of the safety belt, there is a general requirement to arrange it so as to run from a point behind the passenger and to be re-directed at a point close to the shoulders of
30 the passenger, i.e. at a position adapted to the length of the passenger. Against this background it is previously known to adapt a child seat to children having different body sizes by providing it with a safety belt that has an adjustable height. A requirement for adjusting the safety belt may also occur in dependence of the clothing worn by the child to be seated in the child seat. For example, children may often

change from thick winter clothing to thinner clothes. Furthermore, within a family there may be a need for letting different children (with different body sizes) use the same child seat on different occasions. This will also contribute to the requirement of being able to adjust the height of the safety belt. In summary, it can be stated that a
5 height-adjustable safety belt in a child seat provides an opportunity of achieving an optimum protective action for the child, in general independently of the child's body size or of the thickness of the clothing worn by the child.

A previously known child seat comprising a vertically adjustable safety belt is shown
10 in the patent publication US 5098161. The child seat according to this document is detachably arranged on an existing seat of a vehicle and is provided with a safety belt by means of which a child can be fastened. The safety belt is designed with two belt bands running from two points above each shoulder of the child and on to a fastening element which in turn is adapted to be fastened into a lock in the seat of
15 the child seat, between the child's legs.

With the intention of adapting the above discussed, known child seat to children of varying size, the backrest of the seat is provided with a number of openings, located with vertical spacing. The two belt bands may then be arranged to run through
20 appropriately selected openings in the backrest. Depending on the size of the child, the belt band can be detached from a previously selected opening and moved to another opening, giving the optimum fit for the passenger of the child seat.

Although the known child seat discussed above generally functions to satisfaction, it
25 has one substantial drawback in that it is cumbersome and time-consuming to rearrange the belts traps vertically. As small children grow quickly, the child seat will have to be adjusted frequently, and, this being a cumbersome operation, it may easily be neglected, which might in turn entail that the child seat will not provide the desired protective action in case of a collision.

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DISCLOSURE OF INVENTION

The object of the present invention is to provide an improved child seat for vehicles, by the aid of which the above problem is solved and by the aid of which an automatic vertical adjustment is obtained in dependence of the body size of the child.

This object is achieved by a device, the characteristics of which are stated in the accompanying claim 1.

5 The child seat according to the invention comprises a seat, a backrest and a vertically adjustable seat belt consisting of at least one belt band, equipped with a locking device arranged for lockable co-operation with a belt lock that is fixedly anchored in said child seat. The invention is based upon said backrest being designed with at least one vertically extending slot, and the belt band being arranged to run through
10 said slot and up to said belt lock. When a child is placed and fastened into the child seat according to the invention, each individual belt band will be automatically adapted to the body size of the child so as to run over the shoulder portion of the child.

15 According to the invention, the belt band in question can thus be adapted to the passenger of the child seat, in general independently of the body size, or of the clothes worn by the child.

According to a preferred embodiment of the invention, it is utilised as a separate child seat, for detachable attachment into an existing seat of a vehicle.

20

Preferred embodiments of the invention are defined in the accompanying dependent claims.

25 The term "child seat" in this context refers to a particularly designed location in a vehicle that is intended primarily for children of an age of up to about 4 years. This term comprises detachable child seats as well as parts of existing, fixedly mounted vehicle seats. The term "child seat" shall further be regarded as comprising seats turned either forwards or backwards in relation to the travelling direction of the vehicle.

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BRIEF DESCRIPTION OF DRAWINGS

The invention will in the following be described in further detail with reference to a preferred embodiment example and the enclosed drawings, in which:

Fig. 1 shows a front view of a child seat according to the present invention, and
Fig. 2 shows a rear view of a child seat according to the present invention.

MODES FOR CARRYING OUT THE INVENTION

Fig. 1 illustrates a somewhat simplified front view of a child seat according to the present invention. According to a preferred embodiment, the invention is shaped as a separate child seat 1, intended for detachable mounting inside a vehicle, e.g. a passenger car. The child seat 1 is constructed with a seat 2 and a backrest 3, and is preferably manufactured from a hard plastic shell, in appropriate places carrying soft padding. The hard plastic shell is then conveniently covered by upholstery made for example of a textile material. The seat 2 is bounded sideways by two seat sides 4, 5. Preferably, the backrest 3 is somewhat bowl-shaped, i.e. has an extension in depth. In this way a child, preferably with an age of up to about 4 years, travel in the child seat 1 and thereby be retained in a safe way.

In a manner as such known, the child seat 1 is arranged to be mounted the wrong way round in the vehicle in question, i.e. with the backrest 3 turned towards the front of the vehicle. To this end, the child seat 1 comprises fastening elements (not shown) for attachment preferably in the front passenger seat of the vehicle, i.e. the seat arranged beside the driver's seat. Such fastening elements may preferably comprise one or more loops or hooks, providing attachments for an existing safety belt, by the aid of which the child seat 1 can be retained in the seat in question.

According to the invention, the backrest 3 is designed with a first, through slot 6 and a second, through slot 7, extending through the backrest 3. The slots 6, 7 are preferably straight, elongated and generally oriented vertically, but other configurations are also conceivable. Furthermore, the child seat 1 is provided with a safety belt, in turn comprising a first belt band 8 and a second belt band 9, running through the slots 6 and 7 respectively. The two belt bands 8, 9 are, in a conventional manner, made of a woven band of textile or a corresponding material. Each belt band 8, 9 is arranged to run freely through a locking unit 10, 11 in the form of a handle carrying a locking plate 12, 13. Further, the belt bands 8, 9 run on up to a fixation point in the seat 2, preferably adjacent to each seat side 4, 5, respectively. The two locking plates 12, 13 may, in a known manner, be locked into a further locking device in the

form of a belt lock 14. This belt lock is in turn fixedly anchored in the seat 2 via a short band 15 of the same type as the belt bands 8, 9.

According to a conceivable variant of the invention (not shown in the figures), each
5 belt band 8, 9 may be fixedly attached to each locking unit 10, 11, respectively, i.e. without running on further to a fastening point in the seat 2.

Fig. 1 shows the child seat 1 according to the invention in a state where the locking
units 10, 11 are not locked into the belt lock 14. For locking of the locking units 10,
10 11, the locking plates 12, 13 may be inserted into the belt lock 14, which comprises receiving openings for that purpose (not shown). The locking of each locking plate 12, 13 inside the belt lock 14 is as such previously known and is therefore not described in detail here, but is based on a locking element with a catch being
15 arranged inside the belt lock 14 and co-operating with each locking plate 12, 13. The locking plates 12, 13 may further be released from the belt lock 14 by means of a separate release button 16.

Fig. 2 shows a rear view of the child seat 1, from which can be gathered how the
belt bands 8, 9 are attached to the rear side of the backrest 3. According to what
20 was explained before, the slots 6, 7 extend through the backrest 3, so that each belt band 8, 9 comes out on the rear side of the child seat 1. Furthermore, that portion of the belt bands 8, 9 running along the rear side of the backrest 3 are arranged so as to cross each other. The first belt band 8 runs through a re-directing device in the form of a first guide plate 17 that is pivotally attached to the rear side of the backrest
25 3 by means of a fastening screw 19. In a corresponding manner, the other belt band 9 is arranged to run through a re-directing device in the form of a second guide plate 18 that is pivotally attached to the rear side of the backrest 3 by means of another fastening screw 20. Both guide plates 17, 18 can pivot freely in relation to the remainder of the child seat 1.

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The end portions of the belt bands 8, 9 are attached to a fastening plate 21. This fastening plate 21 consists of a loose member; i.e. it is not attached to the child seat 1. To the fastening plate 21 is further attached the end portion of another band 22. This band 22 is of the same type as the above-mentioned belt bands 8, 9, 15, and

arranged to run through a guiding device 23 in the shape of a mounting or plate on the rear side of the backrest 3. The band 22 further runs on along the bottom side of the child seat 1 and on to its front side (see Fig. 1), where the band 22 protrudes. Furthermore, the child seat 1 comprises a (not shown) attachment device arranged to allow alternate loosening and tightening of the band 22. In this way, a person can in a simple manner place a child in the child seat 1 and then fasten it by locking the locking units 10, 11 and subsequently locking the band 22 (that protrudes on the front side of the child seat 1) into a suitable position.

10 Preferably, the rear side of the backrest 3 is designed so as not to prevent any movement of the various bands 8, 9, 22. If, for example, the child seat 1 is placed in such a way that the backrest 3 is turned towards a vehicle instrument panel, it is thus important that the bands 8, 9, 22 will not be pinched between the instrument panel and the child seat 1 so as to prevent any movement of the bands 8, 9, 22, which might in turn impair the function of the safety belt. To this end, the invention may be arranged so as to shape the rear side of the backrest 3 with a countersunk portion (not shown in the figures), housing the bands 8, 9, 22. Such a countersunk portion may then preferably be covered by a thin sheet or plate.

20 The slots 6, 7 are shaped with a width adapted for allowing the belt bands 8, 9 to run freely, in a direction through the slots 6, 7, respectively, as well as vertically, along the slots 6, 7, respectively. Suitably, the width of the slots 6, 7 is in the order of 0,5-2,0 cm. Furthermore, the slots 6,7 have a vertical extension corresponding to that height, within which the shoulder portion of a child seated in the child seat 1 can be expected to be located. The vertical mobility of the belt bands 8, 9 is achieved by the vertical length of the slots 6, 7 being substantially larger than the width of the belt bands 8, 9, respectively. Suitably, the child seat 1 according to the invention is used for children of ages up to about 4 years, whereby the length of the slots 6, 7 is of the order 10-20 cm.

30

After having placed a child in the child seat 1 according to the invention, the child can be fastened by initially placing the belt bands 8, 9 over each shoulder portion of the child and then locking them into the belt lock 14 (comp. Fig. 1). For this purpose, the belt lock 14 is located at a point in front of the child's abdomen, the band 25 run-

ning between the legs of the child to a fastening point in the seat 2. Due to the vertical mobility of the belt bands 8, 9 in the slots 6, 7, the extension of each belt band 8, 9 will, according to the invention, automatically be adapted to the body size of the child, and can always be made to run over the shoulder portion of the child.

5

On the rear side of the backrest 3 (comp. Fig. 2) each guide plate 17, 18 will pivot to a position dependent on the vertical position of each belt band 8, 9 in the slots 6, 7, respectively. Beyond that, the band 22 should be tightened and fixed in the manner described above. In this way, the child seat 1 can be used for children of various body size, the belt bands 8, 9 providing optimum protective action, in general independently of the body size of the child.

10

For adaptation of the safety belt to the body size of the child, the band 15 may furthermore be provided with a (not shown) length adjustment mechanism for correct positioning of the belt lock 14.

15

According to an alternative embodiment of the invention, not shown in the figures, the attachment of each belt band 8, 9 at the rear side of the backrest 3 may be provided by means of a roller for each belt band 8, 9. Such rollers are as such known and will be arranged to be spring loaded so as to roll up its adherent belt band automatically when not in use. When the safety belt is not in use, the belt bands 8, 9 will thus be rolled up and each locking unit 10, 11 will be positioned right in front of the slots 6, 7, respectively. Furthermore, such a roller would then be fitted to the backrest in an articulated manner, in a manner corresponding to that of the guide plates 17, 18 described above. According to this embodiment, two belt rollers can thus be used to replace the guide plates 17, 18, the fastening plate 21 and the band 22 described above.

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According to a variant of said alternative embodiment, the belt rollers may be arranged inside the backrest instead of on its rear side. In this case, the two slots will not extend all the way through the backrest, but only through the front side of the backrest, i.e. that side facing the passenger in the child seat. The belt rollers will then be arranged in a cavity defined inside the backrest, i.e. between its front and rear sides.

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The invention is not limited to the embodiment examples described above and depicted in the drawings, but may be varied within the scope of the appended patent claims. For example, the invention can also be used in those cases where the child seat 1 is placed facing forwards, i.e. where the passenger in the child seat 1 is facing towards the front of the vehicle.

Furthermore, the invention can in principle also be used in those cases where the safety belt only consists of a belt band running diagonally across the upper part of the body of the passenger. In this case, only one through slot in the backrest of the child seat is used. Beyond that applies that the invention may be used in connection with safety belts of the three, four or five point types.

The invention can be completed with various mechanisms for tightening the belt bands 8, 9. For example, each belt band 8, 9 can be provided with a device for adjusting the length of the respective belt band 8, 9. Such devices would preferably be arranged at shoulder height for the passenger of the child seat 1.

The child seat according to the invention may further comprise a part of an existing vehicle seat, e.g. an integrated part of the rear seat of a vehicle or an integrated part of the backrest of the front passenger seat.

Moreover applies that the child seat according to the invention is not limited for use by passengers of a certain age or body size. The invention is however mainly suitable for children up to about 4 years of age.

The slots may be made rectilinear or, alternatively, somewhat curved in shape in order to be adapted in an optimal way to the body shape of a passenger in the child seat 1. Moreover, the slots 6, 7 may be oriented completely vertically or alternatively somewhat obliquely relative to the vertical line.

Finally applies that the two guide plates 17, 18 (see Fig. 2) may be arranged to be adjustable vertically or transversally. This can be achieved by arranging the guide plates 17, 18 displaceably along a groove or the like and providing them with a

locking mechanism, e.g. in the form of a spring-biased cotter pin, by the aid of which each guide plate 17, 18 can be adjusted to a suitable position.

CLAIMS

- 5 1. A child seat (1) for vehicles, comprising a seat (2), a backrest (3) and a vertically adjustable seat belt consisting of at least one belt band (8; 9), equipped with a locking device (10; 11) arranged for lockable co-operation with a belt lock (14) that is fixedly anchored in said child seat (1), c h a r a c t e r i s e d b y said backrest (3) being designed with at least one vertically extending slot (6; 7), and by the
10 belt band (8; 9) being arranged to run through said slot (6; 7) and up to said belt lock (14).
2. The child seat (1) according to claim 1, c h a r a c t e r i s e d i n that said slot is arranged at a position in the backrest (3) that substantially corresponds to the expected location of the shoulder portion of a passenger travelling in
15 the child seat (1).
3. A child seat (1) according to any one of claims 1 or 2, c h a r a c t e r i s e d i n that it is arranged like a child seat (1) for detachable attachment in a vehicle, and comprises means for said attachment.
20
4. A child seat (1) according to any one of the preceding claims, c h a r a c t e r i s e d i n that said belt band (8; 9) is arranged to run from a fastening point (21), provided on the opposite side to that side of the backrest (3),
25 which is turned towards a passenger in the child seat (1), and up to said belt lock (14).
5. The child seat according to claim 4, c h a r a c t e r i s e d i n that it comprises at least one link element (17; 18) for re-directing said belt band (8; 9),
30 said link element (17; 18) being pivotally attached to the backrest (3).
6. A child seat (1) according to claim 4 or 5, c h a r a c t e r i s e d i n that said fastening point (21) consists of a loose fastening plate (21) to which said

belt band (8; 9) is fastened, said fastening plate (21) being connected to the child seat (1).

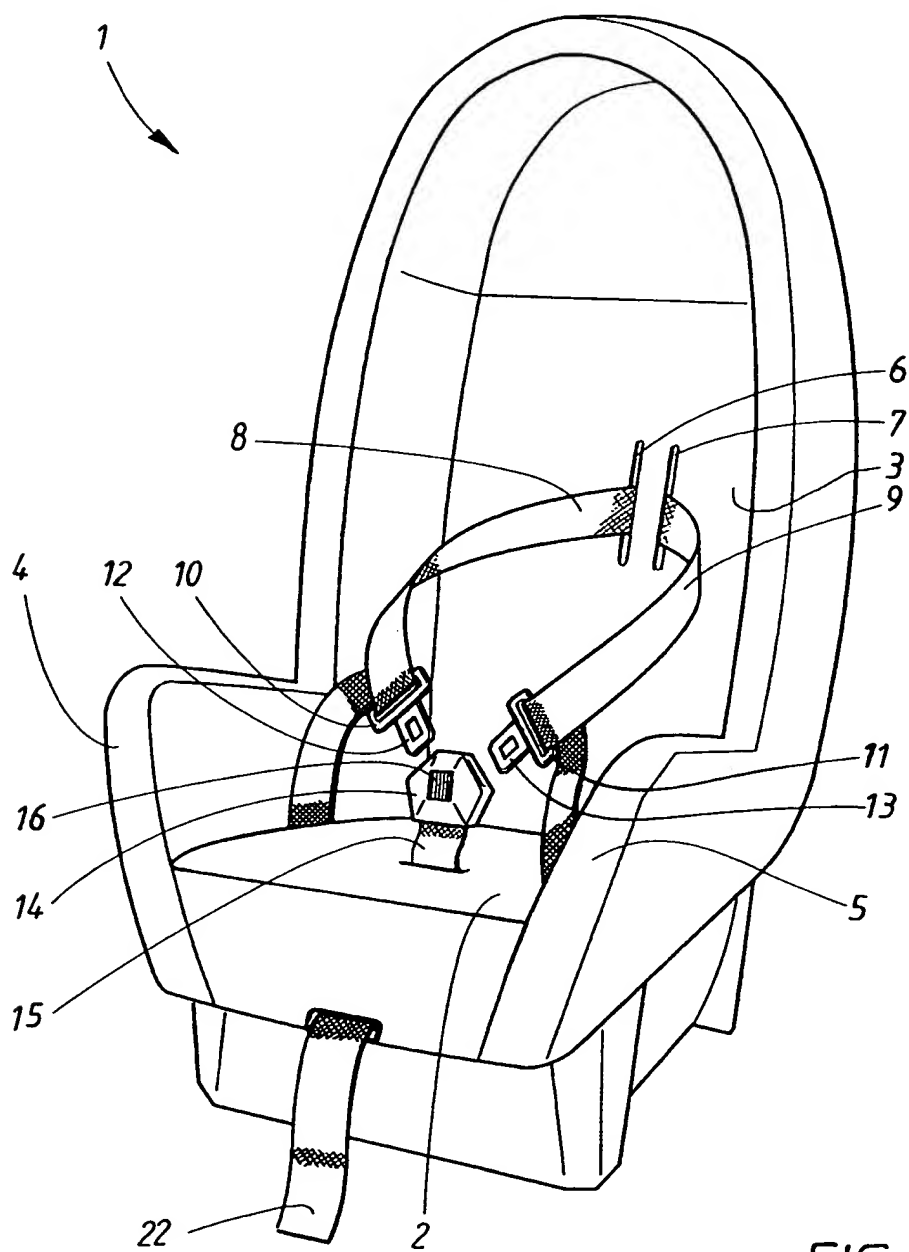
7. The child seat (1) according to claim 4, characterised in
5 that said fastening point is defined by a belt roller for automatic rolling-up of the belt band (8; 9) when not in use.

8. The child seat (1) according to claim 7, characterised in
that said belt roller is arranged in a cavity defined by the interior of the backrest (3).

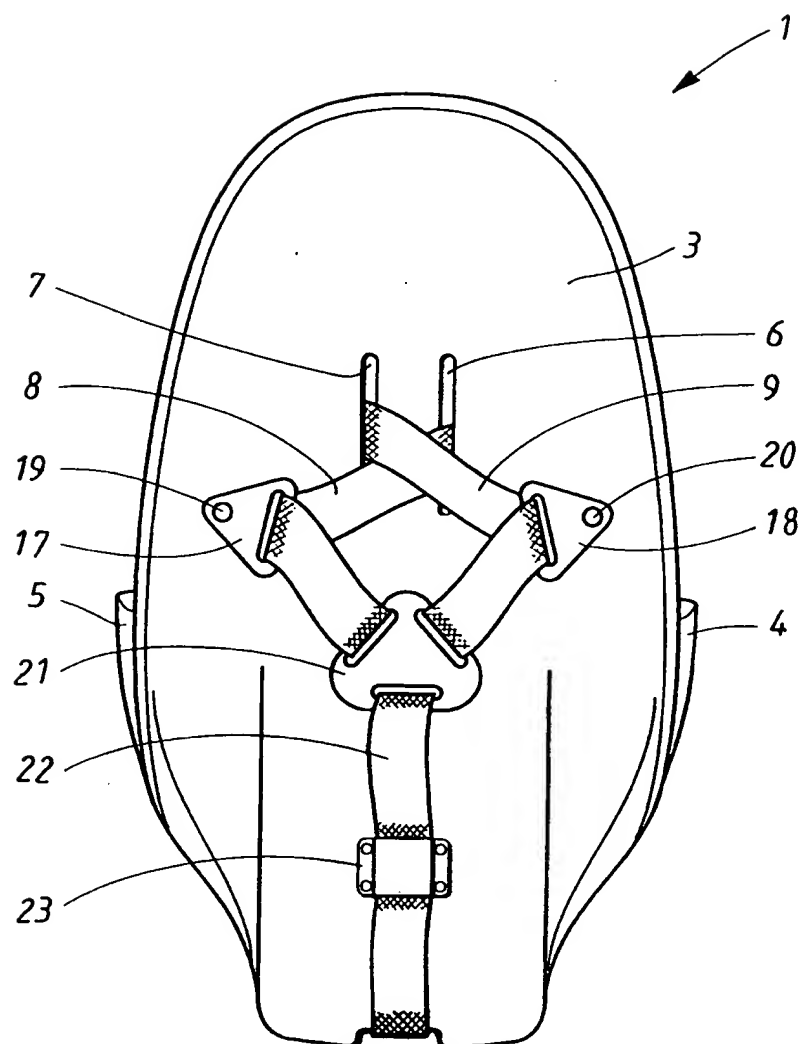
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9. A child seat (1) according to any one of the preceding claims,
characterised by comprising two belt bands (8, 9) running through two
slots (6, 7) in said backrest (3), said slots (6, 7), respectively, being located at the
positions where a passenger in the child seat (1) would be expected to place his
15 shoulder portions.

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FIG. 1

2/2

FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/00020

A. CLASSIFICATION OF SUBJECT MATTER		
IPC6: B60N 2/28, B60R 22/20 According to International Patent Classification (IPC) or to both national classification and IPC		
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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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Y	--	7,8
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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03/05/99

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